APPENDIX 3: HDAR'S ESTIMATED REDUCTIONS IN EFFORT AND LANDINGS FROM THE PROPOSED BRFAS

Appendix 3
Estimated Reduction from Present Day Fishing
Effort and Catch in the Bottomfish Fishery with Alterative 2b.

Provided by the Division of Aquatic Resources, State of Hawaii

Background

In 1998, the Department of Land & Natural Resources', Division of Aquatic Resources (DLNR/DAR) implemented the State of Hawaii's Bottomfish Restricted Fishing Areas (BRFAs), which were designed to conserve marine resources and habitat. The DLNR/DAR has proposed changes in the BRFAs, which are based on an evaluation of landings data, interviews with fishers and completed surveys and mapping of bottomfish depth range and habitat throughout the Main Hawaiian Islands (MHI). As proposed by the state, Alternative 2b would create12 new BRFAs (Appendix Figures 3-1, 3-2, and 3-3). Additionally, current closed areas outside of the proposed 12 BRFAs would be reopened. The evaluation of these proposed BRFAs show that they should reduce the mortality on bottomfish in the MHI by at least 15 percent from 2004 levels.

Rationale

Bottomfish habitat depth range has been defined as the "Essential Fish Habitat" definition provided by NOAA Fisheries (Essential Fish Habitat is within 100 and 400 meters). Since catch (and effort) should be reduced from current levels, and reporting compliance is often delayed, the most complete recent calendar year's commercial data were used (2004). The measure of fishing effort used was the number of licensee-area-trips, based on license number; area fished, and trip end-date. Because multiple records exist for each fisher, area and species these values were computed and summed separately for each area and for the MHI as a whole.

Appendix Table 3-1 shows the resulting estimated total numbers of trips and lbs caught for the seven key species targeted in State and Federal Management Plans. The estimated reduction in fishing effort is 15.11% and there should be a 17.10% reduction in catch. The commercial values are shown, but it should be noted that an equivalent reduction in non-commercial catch is expected.

Appendix Table 3-1, column A shows the amount of catch and effort estimated to be restricted due to the proposed BRFAs (estimated by applying the percentage of EFH to 2004 catch and effort in corresponding commercial fish catch areas).

Appendix Table 3-1, column B shows the portion of current catch and effort estimated to open up, because some areas currently closed in BRFAs would open up (estimated catch/effort in portions of current BRFAs that fall outside proposed areas).

Appendix Table 3-1, column C shows the net change estimated from current levels, which is calculated by subtracting column B from column A.

Appendix Table 3-1: Estimated Change in Catch and Effort						
	A		B		C	
	Estimated Reduction in Catch/Effort due to Closure of Proposed BRFAs		Estimated Increase in Catch/Effort due to Opening of Non-overlapping Portions of Current BRFAs		Estimated Net Change in Catch/Effort from 2004 Levels	
	Trips	Lbs.	Trips	Lbs.	Trips	Lbs.
Closed Areas	697	58,939	286	17,304	411	41,634
% of Total	25.65%	24.21%	10.54%	7.11%	15.11%	17.10%
Other MHI	2,021	184,498			2,307	201,803
% of Total	74.35%	75.79%			84.89%	82.90%
Total MHI (100%)	2,718	243,437			2,718	243,437

There were several assumptions used in estimating the reduction from present day fishing effort in the bottomfish fishery with Alternative 2b.

Assumption 1 - Commercial Data Represents Non-Commercial Catch & Effort: Since only commercial fishers report their catch, complete non-commercial data are not available. Change in fishing effort for non-commercial fishers is assumed to be proportional to the amount of change estimated for commercial fishers.

Justification(s): Fish distribution is strongly tied to depth and habitat. Since the BRFAs restrict access to the fishing grounds equally to both groups, closed areas should apply equally to all fishers. Although there are slight differences in areas targeted by highline commercial fishers, highliners represent a small percentage of commercial fishers. The vast majority of commercial fishers are small-vessel “weekend warriors” who fish similarly to non-commercial fishers, so average commercial catch and effort should resemble non-commercial catch and effort for the most part.

Assumption 2 - Decreases in Fish Catch and Effort will be Proportional to the Change in Essential Fish Habitat Contained in Current vs Proposed BRFAs:

Justification(s): Because of the experience of fishers, and the link between fish distribution and habitat, bottomfishing in each commercial fishing area does not occur everywhere but is focused in the areas where appropriate depth ranges are found. Not all fishers have the experience to know the specific locations of pinnacles, cliffs, etc. identified by DLNR/DAR as Potentially Important Habitat Areas (PIHA, see DLNR/DAR website), but fishing by both commercial and non-commercial fishers can be expected to target the appropriate depth range.

Assumption 3 - Change will be Proportional to Changes in Essential Fish Habitat Enclosed by Current vs Proposed BRFAs, with adjustments for "good habitat" targeting and catch reporting idiosyncrasies

Justification(s): Appendix Figures 3-1, 3-2, and 3-3 shows the commercial fish catch reporting areas and their overlap with existing BRFAs versus recommended BRFAs. The figures also show the distribution of EFH. Based on this information, Appendix Table 3-2 shows the fish catch reporting areas that include all or part of each BRFA and their corresponding proportion (percent) of the EFH in that grid. These percentages were applied to the reported commercial catch and effort estimated to take place within each BRFA. EFH percentages were adjusted somewhat in some commercial fish catch areas, based on information obtained from interviews with fishers regarding the amount of time focused on particular regions (such as "the fingers" of Penguin Bank) and their tendency to "lump" catch from areas (such as Penguin Bank, Ka'ula Rock and some of the pinnacles) into a single commercial fish catch area (not split it with geographic specificity, relying on maps provided by DLNR's Division of Aquatic Resources).

Assumption 4 - Total MHI Trips Equal Sum of Area-Trips

Justification(s): These results are based on using total Area-Trips and reported pounds caught as the 100 percent value for both areas and the MHI during 2004. Area-specific catch and effort were computed for existing and proposed BRFAs and added for the whole MHI. While total catch is not in question, total trips may be somewhat overestimated to the extent there is same-trip overlap between nearby areas. This important of this difference was minimal (5 to 10 percent). It should be noted that including the overlap increases the total MHI effort estimate, which decreases the overall proportion of effort attributable to any given area. Thus, any differences between MHI trips and area-specific trips would tend to increase DLNR/DAR's estimate of overall effort reduction (a smaller total number of trips would apply), making the resulting effort reduction a conservative estimate.

Assumption 5 - Catch & Effort Added Back in Where Current and Proposed BRFAs Overlap in proportion to Enclosed EFH

Justification(s): The proportion of estimated catch and effort for existing BRFAs was added back in to the current effort estimate (as shown in Table 1). This increase was based on the percentage of the current BRFA and corresponding EFH that overlapped with the proposed new BRFAs.

Additional Considerations

Enforcement

In order for area closures to be effective, it is important to have effective enforcement. Problems with the current level of enforcement have been noted and were an incentive to place the proposed BRFAs closer to shore, to the extent possible, and design them with straight-line boundaries, making it easier for both fishers and enforcement officers to determine whether fishing takes place inside or outside the closed areas. An additional component of compliance that DAR can control

directly is to develop an education effort (appropriate signage, brochures, publicity, etc.) to inform fishers of the revised BRFAs and how to report a violation.

In addition, DAR is committed to working closely with DLNR's Division of Conservation and Resources Enforcement (DOCARE) and appropriate federal enforcement agencies to: (1) encourage cooperation in monitoring compliance to improve the likelihood that violations will be detected; (2) to stated the rule in the most concise and unambiguous legal language possible so that detected violations can be prosecuted; (3) testify in legal proceedings to assist in prosecuting violators; and (4) if necessary, encourage a raise in the penalty schedule for violations to serve as an adequate deterrent to potential violators.

Monitoring

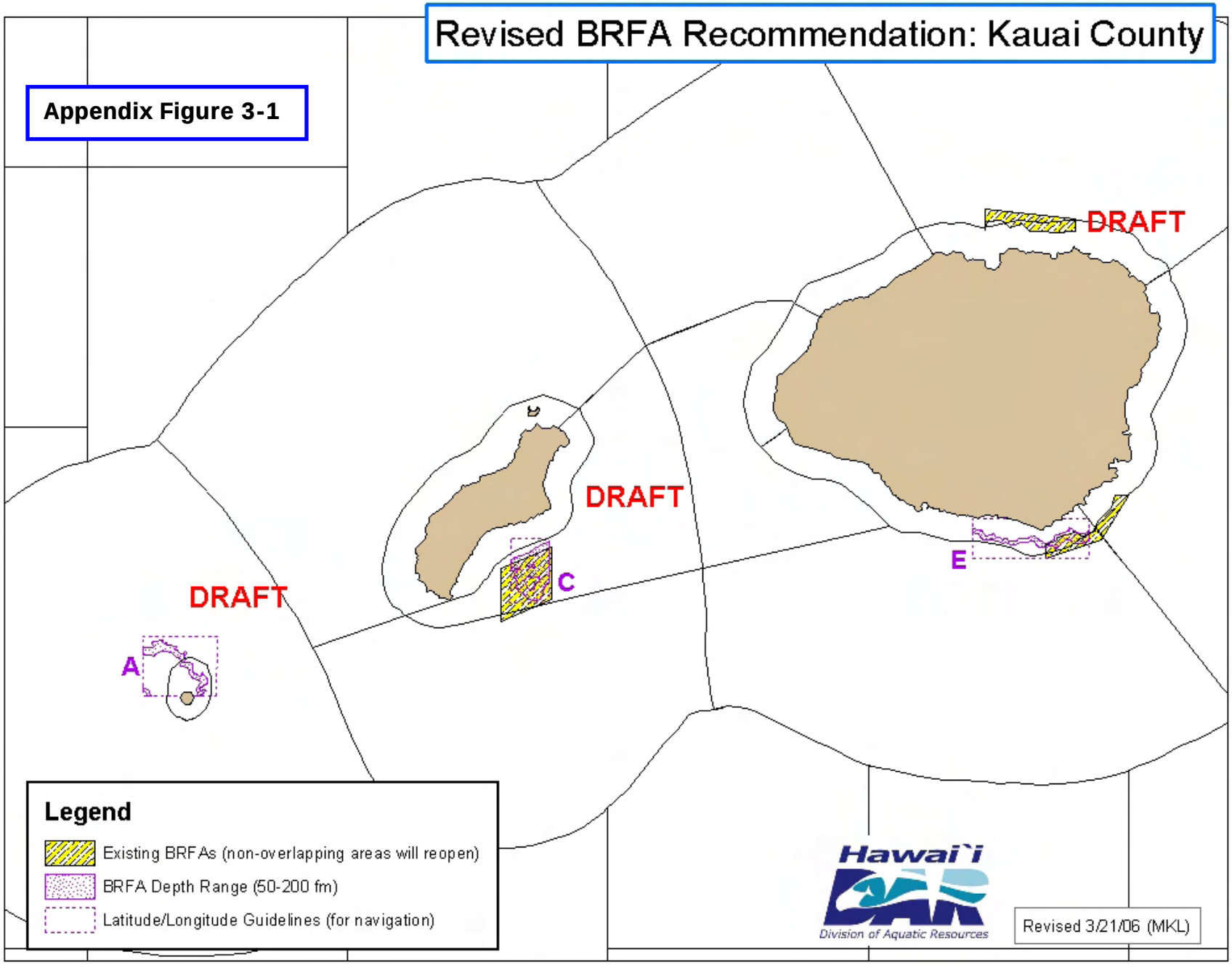
Although specific details of a monitoring program remain to be determined, DAR is committed to developing and implementing monitoring methodology that will allow us to determine how fishing mortality, biomass and size distribution are affected by the BRFAs. This monitoring will include both fishery-dependent and fishery-independent components.

The main source of fishery data will be the existing commercial fish catch data, used to complete the evaluation included in this report. The Hawaii Marine Recreational Fishing Survey provides an additional means to monitor non-commercial catch and effort. This program has expanded to include regular fishing surveys on Oahu, Maui, Molokai, Hawaii and Kauai. An effort will also be made to sub-sample registered non-commercial bottomfish permit holders to evaluate their fishing activity, catch and effort. The intent of all this work will be to compile and monitor the range of catch and effort to ensure the bottomfish fishery can move away from the over-fishing condition.

Regarding fishery-independent monitoring, new technology allows DAR to monitor a grid of stations within appropriate habitats throughout the main Hawaiian Islands, using baited and unbaited video cameras to directly assess species and size-distribution at selected. DAR is committed to continue this work in collaboration with the University of Hawaii. Some catch sampling will be needed within closed areas. Consideration is being given to developing a monitoring effort that will incorporate cooperating fishers as component of a limited sampling program to check periodically changes in size distribution and CPUE within the BRFAs.

Appendix TABLE 3-2: Current/Recommended BRFAs, Commercial Fish Catch Areas & Estimated Percent of Reported Fish Catch/Effort								
BRFA	**Commercial Fish Catch Areas**				**Percentage (%) of Reported Catch/Effort**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**
1	505	525			50	100		
A	508	528			90	100		
C	505	525			50	50		
2	503	523			50	40		
3	500	504	520	524	33	25	0	0
E	500	520			45	100		
F	404	423	424		13	60	23	
4	423				30			
5	407	427			20	35		
6	428				25			
G	408	428			95	95		
7	409	429			25	10		
8	401	421			80	20		
9	420	429	331		15	10	10	
10	328	331			10	20		
H	331	328			60	40		
11	312	332			0	40		
J	313	333			45	20		
12	314	321			10	20		
K	301	314	321	322	10	10	20	10
13	322	323			33	10		
L	304	324			33	100		
14	304	324			15	10		
M	103	123			70	80		
16	122				25			
17	105	124	125		10	5	25	
N	106	126			50	100		
18	106	126			10	100		
O	108	128			33	100		
19	100	120			45	100		
20	101	121			50	0		

Appendix Table 3-3: Estimated Reduction in Bottomfish Catch and effort by County for Proposed BRFAs						
County or Bank	**BRFAs Included**		**Amount of Reduction**			
			CATCH		**EFFORT**	
	Current	**Proposed**	**Lbs.**	**%**	**Trips**	**%**
Kauai	1, 2, 3	A, C, E	7,937	3.26%	31	1.12 %
Honolulu	4, 5, 6, 7, 8	F, G	7,457	3.06	87	3.21
Penguin Bank	9, 10	H	18,522	7.61	177	6.49
Maui	11, 12, 13, 14	J, K, L	6,051	2.49	102	3.74
Hawaii	16, 17, 18, 19, 20	M, N, O	1,667	0.68%	15	0.55%
SUBTOTALS						
Closed Areas Lbs/Trips			**41,634**	**17.10%**	**411**	**15.11%**
Other MHI Lbs/Trips			**201,803**	**82.90%**	**2,307**	**84.89%**
TOTALS Lbs/Trips			**243,437**		**2,718**	
* Values for trips and landings represent the compiled “Estimated Net Change in Catch/Effort from 2004 Levels”, corresponding to column “C” from Table 2, for BRFAs listed within each county						


Revised BRFA Recommendation: Kauai County
Appendix Figure 3-1
DRAFT
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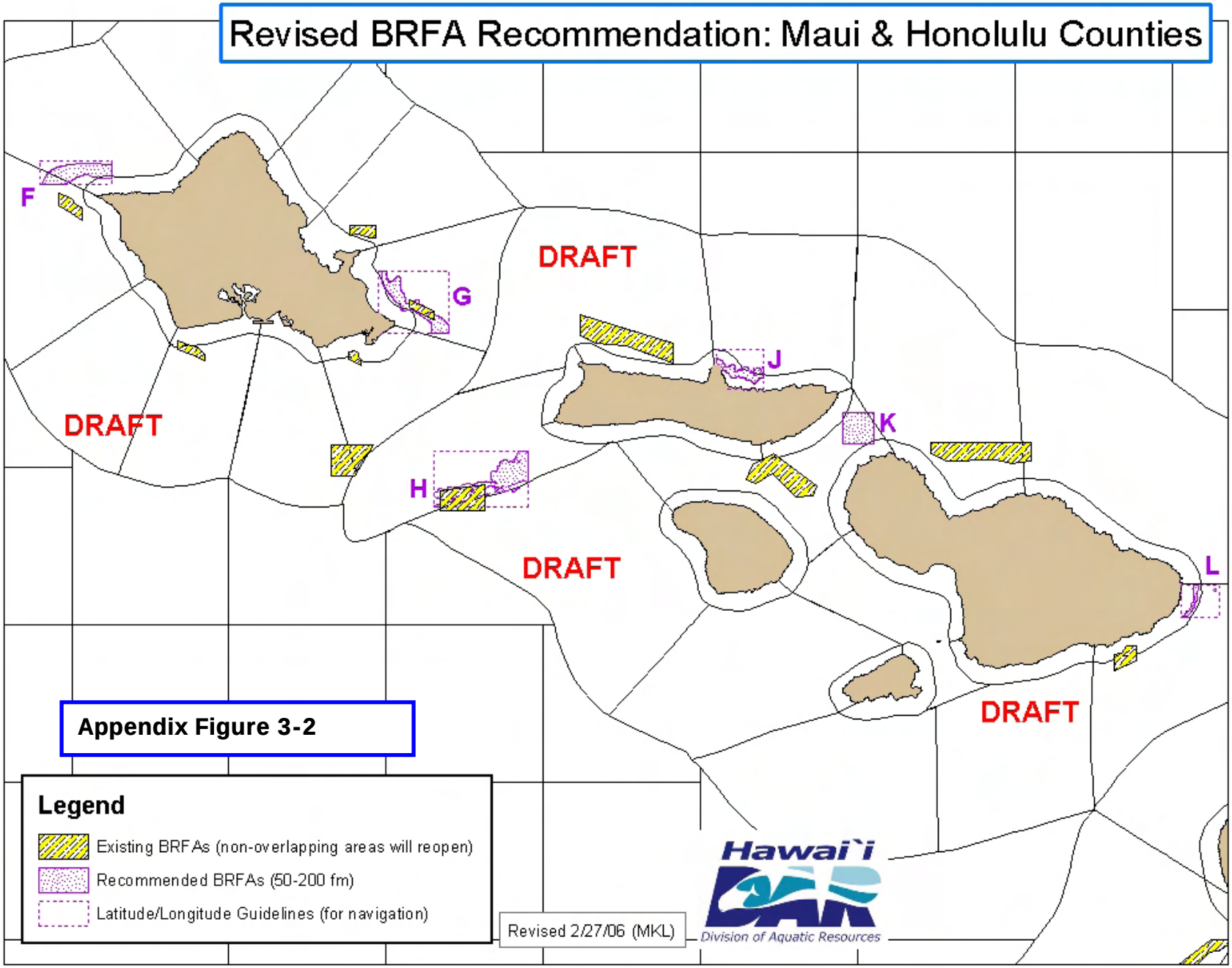
A
C
E
Legend
Existing BRFAs (non-overlapping areas will reopen)
BRFA Depth Range (50-200 fm)
Latitude/Longitude Guidelines (for navigation)
Hawai`i
DAR
Division of Aquatic Resources
Revised 3/21/06 (MKL)


Revised BRFA Recommendation: Maui & Honolulu Counties
F
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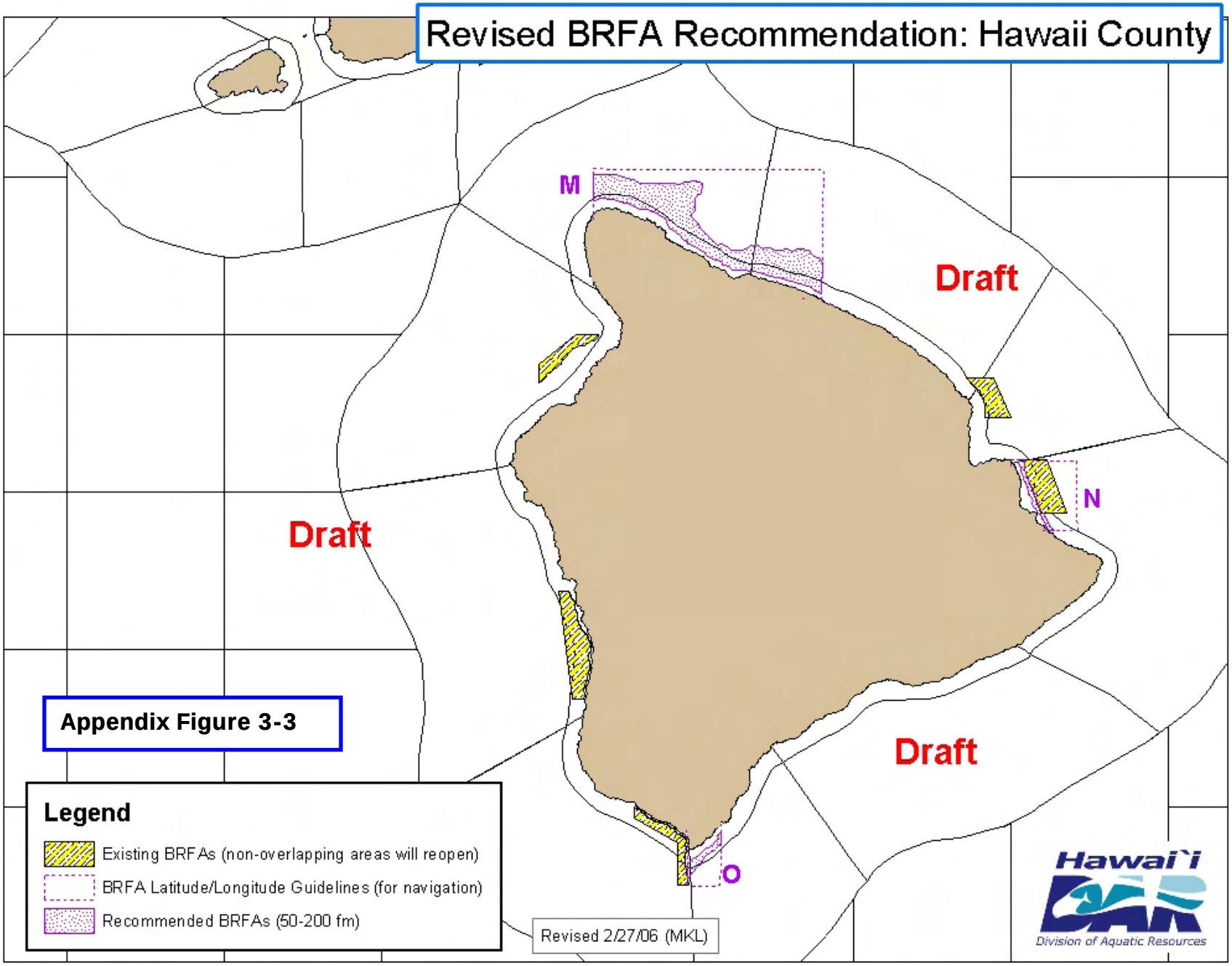
Appendix Figure 3-2
Legend
Existing BRFAs (non-overlapping areas will reopen)
Recommended BRFAs (50-200 fm)
Latitude/Longitude Guidelines (for navigation)
Revised 2/27/06 (MKL)
Hawai`i
DAR
Division of Aquatic Resources


Revised BRFA Recommendation: Hawaii County
M
N
O
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Draft
Appendix Figure 3-3
Legend
Existing BRFAs (non-overlapping areas will reopen)
BRFA Latitude/Longitude Guidelines (for navigation)
Recommended BRFAs (50-200 fm)
Revised 2/27/06 (MKL)
Hawai`i DAR
Division of Aquatic Resources